TECHNOLOGY@ROCKY FLATS

DEMONSTRATION & DEPLOYMENT SUMMARY SHEET

New Decontamination and Measurement Process for Gloveboxes Minimizes TRU Waste

Summary

For the last 40 years at Rocky Flats Environmental Technolgoy Site (RFETS), gloveboxes were used as the primary protective barrier for workers exposed to plutonium in production facilities. From the inception of decommissioning these facilities gloveboxes have been removed by means of hazardous size-reducting operations. With shared risk funds from the Office of Science and Technology and RFETS, workers initiated a new technology for decontaminating gloveboxes.

With the new chemical decontamination process, workers spray a solution inside of the glovebox, dissolving "caked-on" contamination. The process has been so successful that it has virtually eliminated the need for size reduction, thereby retaining the protective barrier of the glovebox itself. After completion of the process, virtually all interior transuranic waste contamination has been removed, to the point where the gloveboxes can be packaged and shipped out in one piece. This new process both enhances worker safety by greatly reducing worker exposure levels, and also reduces waste packaging and shipping costs.

The Need

The majority of gloveboxes at Rocky Flats facilities are contaminated to transuranic (TRU) levels. Because TRU waste containers are relatively small, it was necessary to size-reduce components to place them into the containers. That required a breach of the protective barrier by cutting through the gloveboxes and dismantling them in inner-tent chambers in which Supplied Breathing Air Suits protect workers. Size reduction of gloveboxes is a slow, cumbersome and potentially dangerous operation. The site determined that a safer, more cost efficient method was needed for glovebox removal.

The Technology

The new decontamination process is a four-step procedure that includes three applications of the proprietary chemical to the inside of contaminated gloveboxes followed by subsequent wipe downs. Upon completion of each series of applications and wipe downs, the interior of the glovebox is surveyed for contamination levels and, if necessary, the process is repeated until the desired levels are met. After decontamina-

tion, the gloveboxes can be dispositioned whole low-level waste (LLW) rather than being sized reduced as TRU waste. Because the gloveboxes do not require size reduction after decontamination to LLW levels, secondary waste is also reduced.

The Demonstration

The Building 776/777 Closure Project began the initial trials of the new decontamination process in early 2001. Under the Department of Transportation regulations for LSA/SCO (low specific activity/surface contaminated object), project personnel recognized that shipping all gloveboxes out as TRU waste may not be the only alternative. Current survey instruments used were not able to messure as high as SCO levels so the project team working with the Alpha Group developed a modified instrument and certified procedure to meet new site and NRC/DOT requirements. The project team members then began working with Environmental Alternatives Inc., a company that created the proprietary chemical for the demonstration. By the end of 2001, the new process was fully integrated into the project and shared with Building 771 Closure Project which has since conducted 13 successful decontamination operations on gloveboxes using the new process in.

The calculated volume of TRU waste that would have been generated from the 13 gloveboxes from B771's conventional size-reduction methods was approximately 48 cubic meters. An additional 33 cubic meters of LLW would be generated from Personal Protective Equipment required for entry into the inner-tent chamber. Utilizing the new decontamination process, TRU waste was reduced to 13 cubic meters (primarily consisting of chemical wipes used to wipe down the interior of the glovebox), LLW was virtually eliminated, and total SCO waste was estimated to be 36 cubic meters. This created a reduction of approximately 32 cubic meters of waste.

The Results & Benefits

As the result of the successful decontamination operations, the new method has been adopted throughout Rocky Flats. Building 771 Closure Project alone will be decontaminating approximately 100 remaining gloveboxes with the new process over the next two years, potentially preventing up to 500 cubic meters of TRU waste and 252 cubic meters of secondary LLW. Potential worker exposure will be greatly lowered through the elimination of size-reduction activities. In addition, by using this method, between $22 and $23 million could be saved through avoided TRU and LLW waste management, disposal costs and elimination of size-reduction for these gloveboxes, just in B771. The creation of this process is a significant factor to the acceleration of closure for the Rocky Flats site. The site is expecting to save an estimated 106 million dollars over the lifecycle of the project.

B776/777 CLosure Project personnel perform the second step of wiping down the glovebox during the decontamination process.

Technology Supporting the Path to Closure

For further information about Technology @ Rocky Flats,

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Also, additional information about Rocky Flats is available on the internet at: http://www.rfets.gov